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ABSTRACT

Use of computers at Brown University and attitudes toward computing were investigated in 1984. Major areas of interest were: frequency of weekly computer use, past experience using computers, when respondents first used a computer, their gender, student status, years at the university, major, and parental and familial influences on computer use. Questionnaire responses were obtained from 1,106 students, 340 staff and 176 faculty (both campus- and hospital-based). Findings include: over 85% of respondents had some previous experience using a computer and nearly three-quarters had positive experiences with computers; 70% generally utilized computer facilities on a weekly basis; over 60% of computer users had done word processing at least once during the last 6 months; the second most frequent use was on-line information searching, followed by electronic communication, data analysis and computation, computer games, and storing personal records and other materials; and there was broad interest in expanding computer-oriented instruction and in offering more mini-courses on using computers. Numerous tables are included, and information on sampling procedures and response rates is appended, along with the questionnaire. (SW)

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# COMPUTING AT BROWN UNIVERSITY
# A SURVEY RESEARCH REPORT

by

**Mark Shields**

Institute for Research in Information and Scholarship
and
Department of Sociology

October 1984

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## INTRODUCTION

Brown University, like several other American colleges and universities, has embarked on a major project to expand and diversify its computing, communications, and information systems by the end of this decade. The project involves the development of an integrated network of advanced personal computers called "scholars' workstations," which could be used for a variety of teaching, research, and administrative purposes such as word processing, information retrieval, electronic communication, data analysis, computation, and computer graphics. The far-reaching and sometimes controversial implications of the project have become a topic of lively debate in many quarters of the Brown community.

In the spring of 1983, Brown established the Institute for Research in Information and Scholarship (IRIS) to assume primary administrative responsibility for research and development related to the workstations project. Shortly thereafter, in July 1983, Provost Maurice Glicksman asked a multidisciplinary group of faculty members to serve as a Working Group on the Effects of Scholars' Workstations, whose charge was to advise IRIS and the provost on a program for social and psychological research on the implications of the project. As a first step, the Working Group recommended to the Provost that a survey of the Br wn community be undertaken to collect some "baseline" data on the status of computing in the University before the arrival of large numbers of workstations. No university-wide survey of this magnitude had been undertaken before at Brown on how people use computers and how they view the social, educational, and psychological implications of computing. In consultation with members of the Working Group and a number of other faculty, students, and staff, I compiled a lengthy questionnaire on computing plus a separate series of personal background questions keyed to each of three groups: students, staff, and faculty (both campus- and hospital-based). Over 1600 respondents participated in the survey--1106 students, 340 staff, and 176 faculty--by returning either a mail questionnaire or by completing a telephone interview with a member of the survey project staff. The survey was conducted during the spring semester of 1984, and this report presents a detailed summary of its major findings. Readers who are interested in the details of sampling procedures and response rates should refer to Appendix 1; the questions used in the survey appear in Appendix 2.

## ATTITUDES TOWARD USING COMPUTERS

How does the Brown community view computers and computing? To get a sense of these views, we asked several questions about previous experience, future expectations, and opinions about the implications of computers. On the basis of responses to these questions, we can conclude with confidence that there is widespread and broad-based enthusiasm for using computers and a rather optimistic outlook on their educational and social implications. Over three-fifths (63%) of those responding to the survey described their past experience with computers as "positive," and over four-fifths (81%) described their feelings about using computers in the future as "positive" (Table 1). If people who have never used a computer are excluded, the percentage of all users who described their past experience as "positive" rises to 73%. Less than 4% of all respondents said their past experience was "negative," 20% reported being either "ambivalent" or having "no strong feelings either way," and just 13% said they "haven't used a computer." Students were more likely than faculty and staff to describe their past experience as "negative" or "ambivalent," but significantly *less* likely to say they "haven't used a computer." Thus, while only about a tenth of all students had no prior computing experience, a fifth of all staff and nearly a quarter of all faculty had never used a computer. When asked about their future expectations, students were again more likely than faculty and staff to express

*TABLE 1*

## GENERAL ATTITUDES TOWARD USING COMPUTERS

***"In general, how would you describe your experience in using computers?"***

| | STUDENTS % (N) | FACULTY % (N) | STAFF % (N) | ALL GROUPS % (N) |
|---|---|---|---|---|
| Positive | 63.5 (690) | 64.1 (109) | 60.7 (204) | 62.9 (1002) |
| Negative | 5.0 (54) | 0.0 (0) | 1.2 (4) | 3.6 (58) |
| Ambivalent | 14.0 (152) | 7.6 (13) | 9.8 (33) | 12.4 (198) |
| No Strong Feelings | 8.0 (87) | 4.1 (7) | 7.4 (25) | 7.5 (119) |
| Haven't Used | 9.5 (103) | 24.1 (41) | 21.1 (71) | 13.4 (214) |
| TOTALS | 100% (1086) | 100% (170) | 100% (336) | 100% (1592) |

***"How would you describe your feelings about using computers in the future?"***

| | STUDENTS % (N) | FACULTY % (N) | STAFF % (N) | ALL GROUPS % (N) |
|---|---|---|---|---|
| Positive | 78.5 (867) | 86.1 (149) | 87.1 (296) | 81.1 (1312) |
| Negative | 3.9 (43) | 0.0 (0) | 0.6 (2) | 2.8 (45) |
| Ambivalent | 12.3 (136) | 7.5 (13) | 6.2 (21) | 10.5 (170) |
| No Strong Feelings | 4.7 (52) | 4.6 (8) | 5.0 (17) | 4.8 (77) |
| Don't Plan to Use | 0.5 (6) | 1.7 (3) | 1.2 (4) | 0.8 (13) |
| TOTALS | 100% (1104) | 100% (173) | 100% (340) | 100% (1617) |

"negative" or "ambivalent" feelings about using computers. What is perhaps most striking, though, is that only 13 of the 1617 individuals who answered the question about future computer use said they "don't expect to use a computer."

In summary, then, the vast majority of all respondents (over 85%) reported some previous use of computers, and nearly three-quarters of these users described their experience as "positive." Student users, however, were much less likely than faculty or staff users to describe their past experience as "positive," and more likely to report "negative" or "ambivalent" experiences. This pattern also holds for future expectations. Thus, even though a large majority of respondents from each group were positive about their past experience and future expectations, students stand out as holding generally less favorable views of computers than faculty and staff.

These findings provoke two immediate questions: (1) What accounts for the generally less enthusiastic experience of students, relative to staff and faculty?; and (2) Are the results truly representative of the Brown community? The first question is more complex to answer than the second; in fact, a major focus of this report will be to analyze a number of variables that distinguish "positive" from "negative" or "ambivalent" users and non-users. But before turning to that issue, let us address the second question--the representativeness of responses to the question about past computing experience.

### *Representativeness of the Respondent Sample*

Table 2 shows the distribution of responses to the past experience question by group and mode of response to the survey (first mailing, second mailing, or telephone interview). Recall that the total response rate for the interviews was over 96% (99% for students), compared to 55% for the two mailings combined. In other words, while just over half of those receiving a mail questionnaire returned it, nearly every individual in the telephone subsample completed an interview. This means that *if* there were bias in the final respondent sample, it would be more likely to show up among those who returned a mail questionnaire than among those who completed an interview. Are positive computer users overrepresented in the total respondent sample? Are negative or ambivalent users and, especially, non-users underrepresented? If so, then our results would clearly be skewed in favor of computer enthusiasts.

As Table 2 shows, however, there appears to be little bias of this sort in the final respondent sample. Note, first, that the percentage of positive users is identical in both the first mailing and in the telephone interviews--65% for each method. The percentage of positive users who responded to the *second* mailing is smaller (59%), but not dramatically divergent from the interviews and the first mailing. Second, although the percentage of non-users and negative users is higher among the interviewees than among those who returned the first mail questionnaire, the differences are really quite small (less than 4%); and if we compare *both* mailings with the interviews, the differences are smaller still because the second mailing was almost as effective as the interviews in representing non-users and negative users. Third, the largest difference between interviewees and all mail respondents is among those whose past experience with computers was mixed ("ambivalent"/"no strong feelings either way"): interviewees were *less* likely to describe their past experience in ambivalent or neutral terms. The mail questionnaires thus did not underrepresent respondents with mixed feelings about their past use of computers.

Overall, then, the final respondent sample did not overrepresent positive or frequent computer users, nor did it significantly underrepresent non-users or negative users. Although respondents to the first mailing were less likely than interviewees to be non-

*TABLE 2*

**PAST EXPERIENCE WITH COMPUTERS**
**BY MODE OF RESPONSE TO SURVEY**
***(All 3 Groups)***

***"In general, how would you describe your experience in using computers?"***

| | POSI-TIVE | NEGA-TIVE | AMBIV-ALENT | NO STRONG VIEWS | NEVER USED |
|---|---|---|---|---|---|
| QUESTIONNAIRE (N=1274) | 62.5 % | 3.2 % | 13.1 % | 8.0 % | 13.2 % |
| First Mailing (N=737) | 65.1 | 1.9 | 12.8 | 7.9 | 12.3 |
| Second Mailing (N=537) | 58.8 | 5.0 | 13.6 | 8.2 | 14.3 |
| INTERVIEWS (N=318) | 64.8 | 5.3 | 9.7 | 5.3 | 14.8 |
| TOTALS (N=1592) | 62.9 | 3.6 | 12.4 | 7.5 | 13.5 |

users or negative users, the second mailing served its intended purpose well by increasing the relative proportions of non-users and negative users and decreasing the relative proportion of positive users (in addition to greatly enlarging the size of the final respondent sample). We should also note that the respondent sample did not overrepresent *frequent* computer users: there is no significant association between weekly hours of computer use and mode of response to the survey. It seems fair to conclude, then, that the three "streams" of data collection--first mailing, follow-up mailing, and interviews--worked together quite effectively to yield a representative sample of respondents.

## COMPUTER-RELATED EXPERIENCES AND USES

How frequently do members of the Brown community use computers? What do they use them for? When did they first use a computer? What kind of computer-oriented instruction and training have they had? Do they want to use computers more (or less) often then they do now? These questions will guide our discussion in this section. After examining patterns of use and other computer-related experiences, we will turn in the next two sections to an analysis of several variables that account for differences in attitudes toward using computers and opinions about their pluses and minuses.

### *Patterns of Computer Use and Experiences*

We asked respondents to indicate how often they had used a computer for a variety of specific purposes during the six-month period prior to the survey. As Table 3 shows, computers are being used for a broad range of purposes. Respondents were most likely to use computers for word processing (62%), and least likely to use them for data management functions, such as FOCUS (15%), as well as to collaborate with others, share data, or exchange work (20%). About a third had used a computer to analyze data or perform scientific computations, write or "debug" programs, play computers games, send messages to someone, or store personal records, memos, schedules, etc.

Table 3 also reveals several variations in patterns of use among students, faculty, and staff. Some of these variations reflect the division of labor between faculty and students, on the one hand, and staff on the other. Students and faculty, for example, are more likely than staff to use computers for course-related and research purposes, such as programming and data analysis, while staff are more likely than students and faculty to use them for electronic communication (sending messages or collaborating with others, sharing data, exchanging work). Other variations in patterns of use reflect differences between faculty and staff, on the one hand, and students on the other. For example, students are less likely than faculty and staff to use computers for data management and for storing personal records, memos, and schedules. These differences reflect the greater tendency of staff and faculty to use computers for a variety of administrative and "bookkeeping" functions. In addition, many faculty use computers to compile and organize course notes and research materials.

The most surprising finding here is that over 40% of all users had conducted a computer search for books, journals, or data bases. We did not ask respondents to specify the particular type of on-line search facilities they have used, so this category includes any kind of search during the six-month period prior to the survey. But another question asked all respondents if they had ever used the computer at the circulation desk in either the Rockefeller or Sciences Library (Table 3). Nearly 38% of all respondents had done so, but students were far more likely than faculty or staff to have used the computer at the circulation desk of one of the libraries.

*TABLE 3*

## COMPUTER-RELATED EXPERIENCES AND USES

*% Saying "Yes" (All Respondents)*

| | STUDENTS | FACULTY | STAFF | ALL 3 GROUPS |
|---|---|---|---|---|
| Took CS Course | 43.3 % | 19.5 % | 23.3 % | 36.5 % |
| Other Comp.Course | 37.9 | 23.0 | 18.3 | 32.2 |
| Took Mini-Course | 13.8 | 24.4 | 36.9 | 19.8 |
| Visit Computer Store | 15.7 | 29.1 | 24.7 | 19.0 |
| Used a PC | 51.4 | 48.3 | 36.8 | 48.0 |
| Have Comp. at Brown | 7.7 | 34.1 | 29.6 | 15.1 |
| Used Brown Computer | 67.4 | 46.8 | 60.9 | 63.8 |
| Used Library Comp. | 45.8 | 27.6 | 16.6 | 37.8 |

*% Using Computer In Past 6 Months For Each Purpose (Users Only)*

| | | | | |
|---|---|---|---|---|
| Word Processing | 62.2 | 64.6 | 59.8 | 62.0 |
| Programming | 41.9 | 35.4 | 19.4 | 36.3 |
| Games | 34.9 | 29.7 | 27.9 | 33.1 |
| Send Messages | 33.8 | 27.9 | 42.3 | 34.9 |
| Data Analysis | 33.3 | 59.5 | 25.9 | 34.4 |
| On-Line Searches | 40.6 | 50.8 | 36.6 | 40.8 |
| Collaborate w/ Others | 15.4 | 25.4 | 35.7 | 20.2 |
| Store Personal Records | 27.8 | 39.5 | 43.0 | 31.8 |
| Data Management | 10.6 | 25.4 | 26.8 | 15.1 |

In fact, based on responses to both "search" questions, we found that 80% of those students who said they had used a computer to search for books, journals, or data bases had also used a library circulation desk computer. On the other hand, while only 28% of the faculty and 17% of the staff had ever used one of the circulation desk computers, 51% of the faculty and 37% of the staff said they had used a computer to search for books, journals, or data bases at least once in the past six months. Thus, faculty and staff are using search facilities other than the libraries' circulation desk computers.

Two other dimensions of computing experience--access to computers and computer-oriented coursework--confirm some predictable differences among students, faculty, and staff. Students are almost twice as likely as faculty and staff to have taken a course in computer science or another course that required them to use a computer (Table 3). Indeed, 43% of all students have taken a computer science course (not necessarily at Brown), and another 23% said they expect to take a computer science course in 1984. On the other hand, only 14% of all students have attended a non-credit "mini-course" on computing (such as CMS, XEDIT, SCRIPT, FOCUS, SAS, SPSS, WORD-11), compared to 37% of the staff and 24% of the faculty.

One of the most dramatic variations in computing experiences is also a predictable one: faculty and staff are about four times more likely than students to have direct personal access to a computer or computer terminal at Brown. In answer to the question "Have you acquired a personal computer or computer terminal to use at Brown?" less than 8% of all students said "yes," compared to 34% of the faculty and 30% of the staff. The verb "acquired" may well have been ambiguous to many respondents because of its multiple connotations, so this finding should be interpreted as a rough approximation of differences in perceived personal access to computers. Even with this caveat in mind, the *size* of the difference between students, on the one hand, and faculty and staff, on the other, is very sizeable and consistent with expectations. As almost any student user can attest, timely access to public terminals throughout the University can be exceedingly difficult. This commonplace observation is highlighted by two other findings of the survey: (1) among active computer users, 86% of the students rely on Brown's mainframe computer, compared to 58% of the faculty and 66% of the staff; and (2) students are almost twice as likely as faculty or staff to recommend better access to computer facilities at Brown (see Table 11).

### *Frequency of Use*

How often do respondents use a computer? For the 959 active computer users who responded to the survey, the median weekly frequency of computer use is about six hours, which varies from four hours among faculty to eight hours among staff, with students at five hours a week. ("Active" users are those who provided an estimate of their average weekly hours of computer use.) Table 4 reveals that over a third (36%) of all active users reported using a computer for at least ten hours a week; nearly one-half (48%) of the staff reported ten hours or more a week. By contrast, 15% of all active users estimated that they used a computer for no more than an hour a week. As a group, the 959 active users constitute 59% of all respondents in the survey, which suggests tha up to three-fifths of the Brown community could be considered active computer users.

We can also see from Table 4 that over 60% of these active users said they would like to use computers *more often*. Nearly a third were satisfied with their current frequency of use, while just 5% said they would like to use computers *less often*. Faculty tend to be more eager than staff or students to use computers more often; in fact, none of the faculty respondents wanted to use computers *less* often.

*TABLE 4*

## FREQUENCY OF COMPUTER USE
*(Active Users Only)*

***"On average, how many hours per week do you use a computer?"***

| NUMBER HOURS PER WEEK | STUDENTS % (N) | FACULTY % (N) | STAFF % (N) | ALL 3 GROUPS % (N) |
|---|---|---|---|---|
| 1 or Less | 15.1 (99) | 15.3 (15) | 16.7 (34) | 15.4 (148) |
| 2 - 5 | 35.2 (231) | 42.9 (42) | 26.0 (53) | 34.0 (326) |
| 6 - 9 | 16.3 (107) | 8.2 (8) | 9.8 (20) | 14.1 (135) |
| 10 - 13 | 16.0 (105) | 13.3 (13) | 14.2 (29) | 15.3 (147) |
| 14 or More | 17.5 (115) | 20.4 (20) | 33.3 (68) | 21.2 (203) |
| TOTALS | 100% (657) | 100% (98) | 100% (204) | 100% (959) |
| Median No. Hours | 5. | 4 | 8 | 6 |

***"Would you rather use a computer MORE or LESS often than you do now?"***

| | STUDENTS % (N) | FACULTY % (N) | STAFF % (N) | ALL 3 GROUPS % (N) |
|---|---|---|---|---|
| MORE OFTEN | 60.5 (394) | 80.0 (76) | 66.2 (133) | 63.7 (603) |
| LESS OFTEN | 6.3 (41) | 0.0 (0) | 4.0 (8) | 5.2 (49) |
| SAME | 33.2 (216) | 20.0 (19) | 29.9 (60) | 31.1 (295) |
| TOTALS | 100% (651) | 100% (95) | 100% (201) | 100% (947) |

## ATTITUDES TOWARD COMPUTING: A CLOSER LOOK

Thus far we have focused on several general comparisons of computer use, experience, and attitudes *between* students, faculty, and staff. It is now time to turn to a closer examination of some factors related to variations *within* each group. We will focus mainly on students, primarily because as a group they reflect several important internal differences in computing experience and attitudes. In a sense, the comparative absence (or insignificance) of certain differences among faculty and staff highlight the importance of such differences among students. In other respects, as we shall see, students, faculty, and staff are quite similar to each other.

As in the previous section, our major variables of interest will be (1) frequency of weekly computer use and (2) past experience using computers. In addition, we will also look at (3) several other variables that bear a close relationship to past experience and use: when respondents first used a computer, gender, student status, years at Brown, academic discipline, and parental and familial influences on computer use. As we shall see, while many of these variables are related to past computing experience and frequency of use among students as a whole, the differences are greatly reduced when we look at *active* users alone. The same tendency holds for faculty and staff.

### *Time of First Computer Use*

We asked respondents to indicate when they first used a computer: before coming to Brown, since coming to Brown, or not at all. Over 53% of all respondents first used a computer before they came to Brown; faculty and, especially, students were far more likely than staff to be pre-Brown users (Table 5). Among undergraduates, there is a consistent inverse relationship between class year and first using a computer before attending Brown. Seventy percent of all freshmen were introduced to computing before entering Brown, followed by sophomores (66%), juniors (53%), and seniors (49%). In other words, though about half of the juniors and seniors first used a computer before entering Brown, this is true for over two-thirds of the freshmen and sophomores. In light of the growing emphasis on "computer literacy" and the proliferation of computers in primary and secondary schools, this "split" between younger and older undergraduates reflects an ongoing trend toward virtually universal pre-college computer instruction.

Table 5 also shows that students in the physical sciences are most likely to have first used a computer before entering Brown (80%), whereas those in the humanities and social sciences are least likely to have done so (47% and 49%, respectively). These differences are related to the sex composition of the academic divisions (Table 6). Nearly 70% of all physical sciences students are men--far higher than in any other discipline. By contrast, only 43% of all humanities students, 44% of students in the social sciences, 45% of those in combined/independent studies, and 52% of the life sciences students are male. Because men are more likely than women to have first used a computer before attending Brown (Table 5), the sex composition of the disciplines accounts for some of the variation in time of first use. We also should point out that among both faculty and staff, women are less likely than men to have first used a computer before coming to Brown--about a 10% difference in both groups.

It is worth noting that all of the differences in time of first use presented in Table 5 persist even among active computer users. That is, if we exclude both non-users and non-active users from the analysis, we still find that the time of first use varies by gender, undergraduate class, student status, and academic division among active users; with the sole exception of student status, moreover, these variations are statistically significant.

*TABLE 5*

## FIRST USE OF A COMPUTER BY SELECTED CHARACTERISTICS

***"When did you first use a computer?"***

***All Respondents***

| | STUDENTS % (N) | FACULTY % (N) | STAFF % (N) | ALL 3 GROUPS % (N) |
|---|---|---|---|---|
| BEFORE BROWN | 60.9 (672) | 47.4 (83) | 31.5 (107) | 53.2 (862) |
| SINCE BROWN | 29.8 (329) | 29.1 (51) | 47.6 (162) | 33.5 (542) |
| HAVEN'T USED | 9.3 (103) | 23.4 (41) | 20.9 (71) | 13.3 (215) |
| TOTALS | 100% (1104) | 100% (175) | 100% (340) | 100% (1619) |

***All Students***

| | BEFORE BROWN | SINCE BROWN | NEVER USED |
|---|---|---|---|
| UNDERGRAD CLASS* | | | |
| Freshman (N=226) | 69.9% | 14.6% | 15.5% |
| Sophomore (N=236) | 65.7 | 25.8 | 8.5 |
| Junior (N=177) | 53.1 | 36.7 | 10.2 |
| Senior (N=241) | 48.5 | 45.2 | 6.2 |
| STUDENT STATUS | | | |
| Undergrad (N=880) | 59.5 | 30.5 | 10.0 |
| Graduate (N=224) | 66.1 | 27.2 | 6.7 |
| ACADEMIC DIVISION* | | | |
| Humanities (N=324) | 46.9 | 37.3 | 15.7 |
| Life Sci. (N=146) | 65.1 | 26.7 | 8.2 |
| Physical Sci. (N=276) | 79.7 | 17.8 | 2.5 |
| Social Sci. (N=172) | 49.4 | 43.0 | 7.6 |
| Combined (N=174) | 64.4 | 25.9 | 9.8 |
| SEX* | | | |
| Men (N=564) | 66.3 | 26.8 | 6.9 |
| Women (N=540) | 55.2 | 33.0 | 11.9 |

*Chi-square significance <.001

*TABLE 6*

## DISTRIBUTION OF SEXES BY ACADEMIC DIVISION*

*All Students*

| | UNDERGRAD | | GRAD & MED | | TOTAL | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Humanities | 43.0 | 57.0 | 39.3 | 60.7 | 42.3 | 57.7 |
| Life Sciences | 46.1 | 53.9 | 65.9 | 34.1 | 52.1 | 47.9 |
| Physical Sciences | 62.8 | 37.2 | 81.8 | 18.2 | 68.8 | 31.2 |
| Social Sciences | 39.4 | 60.6 | 66.7 | 33.3 | 44.2 | 55.8 |
| Combined/Indep. | 44.8 | 55.2 | --- | --- | 44.8 | 55.2 |
| All Divisions | 47.4 | 52.6 | 65.0 | 35.0 | 51.0 | 49.0 |

*Active Student Computer Users*

| | | | | | | |
|---|---|---|---|---|---|---|
| Humanities | 47.0 | 53.0 | 42.1 | 57.9 | 45.8 | 54.2 |
| Life Sciences | 50.0 | 50.0 | 63.6 | 36.4 | 54.1 | 45.9 |
| Physical Sciences | 65.2 | 34.8 | 84.5 | 15.5 | 71.2 | 28.8 |
| Social Sciences | 41.3 | 58.7 | 67.9 | 32.1 | 48.5 | 51.5 |
| Combined/Indep. | 52.7 | 47.3 | --- | --- | 52.7 | 47.3 |
| All Divisions | 53.3 | 46.7 | 68.6 | 31.4 | 57.1 | 42.9 |

*All distributions statistically significant at <.01

Two other background variables are associated with students' first use of computers: having a computer or computer terminal at home and a father or mother who uses a computer at work. While just 29% of all students said their family has a computer at home, 70% of this group first used a computer before coming to Brown, compared to 57% of those students whose families do not have one at home. In addition, among those 259 students (25%) whose mother uses a computer at work, 65% (169) first used a computer before coming to Brown. Similarly, while 58% of those students whose father does *not* use a computer at work were introduced to computing before coming to Brown, this is true for 66% of those whose father *does* use a computer at work. These differences persist even if we exclude non-users and unactive users. In other words, among active computer users, those whose family has a computer at home, as well as those whose mother or father uses a computer at work, are more likely than those who don't to have first used a computer before entering Brown. While these differences are not dramatic, they point nonetheless to the importance of parental and family influences on computer use.

Indeed, the influence of interpersonal relationships on computer use extends beyond the family to peer groups. Our survey found that students who said that many of their closest colleagues (friends) like to use computers are more likely than other students to characterize their past experience with computing as favorable (r=.27). Similarly, among active student computer users, there is a positive correlation between frequencey of use and having colleagues who like to use computers (r=.21). The same associations exist among faculty and staff, although the correlations between past experience and having colleagues who like to use computers are lower than among students (r=.14 for faculty and .15 for staff).

Do students who first used a computer before attending Brown tend to be more frequent users and to regard their past experience more favorably than those who first used a computer after entering Brown? Our data indicate that neither frequency of use nor past experience are significantly associated with time of first use. Although the differences are rather small, Table 7 does show a consistent tendency for students who first used a computer before coming to Brown to be somewhat more "positive" and somewhat less "negative" or "ambivalent" about their past experience than those who first used a computer after entering Brown. The pattern exists for both users and active users only, although active users are considerably more enthusiastic than unactive users.

Time of first use has virtually no association with frequency of use. Among active student users, those who first used a computer before entering Brown average about 5.5 hours a week, compared to 5.0 hours for those who first used a computer after coming to Brown.

As Table 7 shows, however, there is a significant relationship between past experience and frequency of use: frequent weekly computer users tend to be more positive than infrequent users. Almost 90% of the most frequent users (10 hours or more/week) are "positive" about their past computing experience, as opposed to 70% of the least frequent users (1 hour or less/week). Conversely, the least frequent users are about four times more likely than the most frequent users to be "ambivalent" about their past experience. These differences are present among faculty and staff as well although the size of the differences varies slightly within each group. We should note that the overall correlations between past experience and frequency of use are rather low for each group--.17 for students, .22 for faculty, and .13 for staff--which indicates that the relationship is not strongly linear (i.e., increasing use does not *consistently* mean a more positive past experience, as Table 7 suggests). Nevertheless, the contrast between the least frequent users and other users is quite pronounced and suggests that familiarity tends to breed contentment.

*TABLE 7*

**PAST EXPERIENCE WITH COMPUTERS BY TIME OF FIRST USE**
***(Student Computer Users Only)***

| | POSI-TIVE | NEGA-TIVE | AMBIV-ALENT | NO STRONG FEELINGS |
|---|---|---|---|---|
| ***ALL USERS*** (N=981) | 70.2% | 5.5% | 15.5% | 8.8% |
| Before Brown (N=657) | 72.0 | 5.2 | 14.5 | 8.4 |
| Since Brown (N=324) | 66.7 | 6.2 | 17.6 | 9.6 |
| ***ACTIVE USERS*** (N=652) | 82.2 | 2.6 | 10.9 | 4.3 |
| Before Brown (N=436) | 84.2 | 2.3 | 10.1 | 3.4 |
| Since Brown (N=216) | 78.2 | 3.2 | 12.5 | 6.0 |
| ***WEEKLY HOURS OF USE**** | | | | |
| 1 or Less (N=98) | 69.4 | 5.1 | 19.4 | 6.1 |
| 2 - 5 (N=228) | 81.6 | 3.1 | 11.0 | 4.4 |
| 6 - 9 (N=107) | 78.5 | 1.9 | 13.1 | 6.5 |
| 10 - 13 (N=105) | 87.6 | 1.9 | 7.6 | 2.9 |
| 14 or More (N=115) | 93.0 | 0.9 | 4.3 | 1.7 |

*Chi-square significance <.05

### *Students' Past Experience and Frequency of Computer Use*

Let us now turn to a brief examination of the relationships between past experience, frequency of use, and several background variables: years at Brown, academic discipline, student and faculty status, sex, and racial background. As in the previous discussion, we will emphasize variations among students. The rationale for focusing on internal differences among students (as noted earlier) is straightforward: most of the significant variations are found among them, not among faculty and staff.

Table 8 shows the relationship between past experience and years at Brown, student status, academic discipline, gender, and racial background for all student respondents. Except for race, all of these variables have a statistically significant association with past computing experience. Students tend to become more positive (and less negative) about their past experience the longer they have been at Brown, though there is also a tendency for fourth-year students to be somewhat less positive than third-year students, much less positive than fifth-year-plus students, and the most ambivalent of all students. An explanation of this departure from the trend is two-fold: (1) most of the fifth-year-plus students are graduate and medical students, who are more likely than undergraduates to describe their past experience as positive (Table 8); and (2) undergraduate seniors, who represent the vast majority of fourth-year students in the sample, are more likely than others to describe their past experience as "ambivalent."

If, however, we focus on *active* student users only (Table 9), the relationship between past experience and years at Brown looks quite different. First-year students are still the least enthusiastic, fourth-year students still less enthusiastic than third- and fifth-year-plus students; yet there are no dramatic differences in past computing experience among second- through fifth-year-plus students. This finding, we should note, is consistent with the weak relationship between years at Brown and frequency of use among active student computer users.

Returning to Table 8, we can see that undergraduates are significantly less likely than graduate and medical students to characterize their past experience with computers as "positive" (73% vs. 61%), and consistently more likely to be "negative" or "ambivalent," to have "no strong feelings either way," and to have never used a computer. This may be explained to some extent by the divergent sex distributions among undergraduates and graduate/medical students. As we discuss below, women tend to be less enthusiastic than men about their past experience with computers. With this in mind, it is noteworthy that 65% of the graduate and medical students in the sample are men, compared to 48% of the undergraduates.

If we turn to Table 9, however, we see that (once again) the difference between graduate/medical students and undergraduates practically disappears when we look at *active* users. In this comparison, about 82% of the undergraduate users describe their past computing experience as "positive," compared to 84% of the graduate and medical student users.

Is there a humanities vs. sciences "split" past computing experience? Once again, the survey suggests that this is true when we look at all students, but not when we look at active users. As Table 8 shows, compared to students in other disciplines (including combined or independent concentrators), humanities students are least likely to be "positive" and most likely to be "ambivalent" about their past computing experience; they are also more likely than other students to be non-users. Students in the physical sciences, not surprisingly, are at the other end of the continuum--they are the most positive, least ambivalent or negative, and also least likely to be non-users (less than 3%).

*TABLE 8*

## PAST COMPUTING EXPERIENCE BY SELECTED CHARACTERISTICS
*(All Students)*

| | POSITIVE | NEGATIVE | AMBIVALENT | NO STRONG VIEWS | HAVEN'T USED |
|---|---|---|---|---|---|
| ***NO. YRS. AT BROWN**** | | | | | |
| 1 (N=280) | 57.1% | 6.1% | 13.9% | 7.9% | 15.0% |
| 2 (N=292) | 62.3 | 5.8 | 12.3 | 10.3 | 9.2 |
| 3 (N=208) | 68.3 | 3.4 | 13.5 | 5.8 | 9.1 |
| 4 (N=239) | 64.0 | 4.6 | 17.6 | 7.9 | 5.9 |
| 5+ (N=67) | 79.1 | 3.0 | 10.4 | 6.0 | 1.5 |
| ***STUDENT STATUS**** | | | | | |
| Undergrad (N=864) | 61.2 | 5.6 | 14.6 | 8.4 | 10.2 |
| Grad/Med (N=222) | 72.5 | 2.7 | 11.7 | 6.3 | 6.8 |
| ***ACADEMIC DIVISION**** | | | | | |
| Humanities (N=315) | 52.7 | 7.0 | 15.6 | 8.6 | 16.2 |
| Life Sci. (N=143) | 63.6 | 4.2 | 14.7 | 9.1 | 8.4 |
| Physical Sci. (N=276) | 79.0 | 2.5 | 10.5 | 5.4 | 2.5 |
| Social Sci. (N=173) | 64.7 | 5.3 | 14.1 | 8.2 | 7.6 |
| Combined (N=172) | 58.7 | 5.8 | 15.1 | 10.5 | 9.9 |
| ***SEX**** | | | | | |
| Men (N=552) | 70.7 | 4.2 | 10.7 | 7.4 | 7.1 |
| Women (N=534) | 56.2 | 5.8 | 17.4 | 8.6 | 12.1 |
| ***RACIAL BACKGROUND*** | | | | | |
| Asian (N=85) | 76.5 | 1.2 | 5.9 | 9.4 | 7.1 |
| Black (N=53) | 54.7 | 3.8 | 24.5 | 5.7 | 11.3 |
| Hispanic (N=27) | 59.3 | 0.0 | 14.8 | 14.8 | 11.1 |
| White (N=915) | 62.7 | 5.6 | 14.2 | 7.9 | 9.6 |

*Chi-square significance <.05

*TABLE 9*

**PAST COMPUTING EXPERIENCE BY SELECTED CHARACTERISTICS OF ACTIVE STUDENT USERS**

| | POSITIVE | NEGATIVE | AMBIVALENT | NO STRONG FEELINGS |
|---|---|---|---|---|
| ***NO. YRS. AT BROWN*** | | | | |
| 1 (N=137) | 78.8% | 3.6% | 14.6% | 2.9% |
| 2 (N=172) | 83.7 | 2.3 | 8.7 | 5.2 |
| 3 (N=136) | 84.6 | 2.9 | 8.1 | 4.4 |
| 4 (N=160) | 81.3 | 1.9 | 12.5 | 4.4 |
| 5+ (N=48) | 83.3 | 2.1 | 10.4 | 4.2 |
| ***STUDENT STATUS*** | | | | |
| Undergrad (N=495) | 81.6 | 2.6 | 11.3 | 4.4 |
| Grad/Med (N=158) | 84.2 | 2.5 | 9.5 | 3.8 |
| ***ACADEMIC DIVISION*** | | | | |
| Humanities (N=151) | 80.8 | 3.3 | 11.9 | 4.0 |
| Life Sci. (N=74) | 79.7 | 1.4 | 16.2 | 2.7 |
| Physical Sci. (N=229) | 85.6 | 2.6 | 8.3 | 3.5 |
| Social Sci. (N=103) | 81.6 | 1.9 | 10.7 | 5.8 |
| Combined (N=92) | 80.4 | 3.3 | 9.8 | 6.5 |
| ***SEX*** | | | | |
| Men (N=372) | 85.5 | 2.2 | 8.6 | 3.8 |
| Women (N=281) | 77.9 | 3.2 | 13.9 | 5.0 |
| ***RACIAL BACKGROUND*** | | | | |
| Asian (N=64) | 89.1 | 0.0 | 6.3 | 4.7 |
| Black (N=32) | 71.9 | 0.0 | 21.9 | 6.3 |
| Hispanic (N=16) | 87.5 | 0.0 | 12.5 | 0.0 |
| White (N=536) | 81.7 | 3.2 | 10.8 | 4.3 |

Indeed, what stands out in Table 8 is not so much the difference between humanities students and others--although this difference exists--but the difference between students in the physical sciences and those in other disciplines. Yet, as a glance at Table 9 reveals, there are no dramatic disciplinary differences in past experience among *active users*. Physical sciences students, to be sure, remain the most enthusiastic--and incidentally, the most frequent users--but the range of the difference between them and students in other disciplines is quite small. Students in the physical sciences also are far more likely to be male than students in any of the other disciplines (71% vs. 49% for the others combined).

As we noted earlier, male students are significantly more likely than female students to regard their past computing experience as "positive"; men are also less likely than women to be "negative," "ambivalent," or non-users. While this pattern persists even among active computer users, the differences become much smaller (Table 9). Active women users also are slightly less likely than men to be frequent users, but this difference (like past computing experience) is statistically insignificant.

Finally, Tables 8 and 9 show that students of Asian background are more likely than other students to be enthusiastic about their past computing experience. Black students tend to the least enthusiastic and the most ambivalent, while white and Hispanic students tend to group together in the middle. These variations, however, are not statistically significant, and it is important to note that the number of black and Hispanic respondents is too small for reliable generalizations about the relationship between racial background and past experience.

To sum up, then, while there are significant--and sometimes striking--differences in past experience with computing by years at Brown, student status, academic discipline, and gender, none of these differences are large or statistically significant when we look only at active student users. What this pattern suggests is that (1) there are important variations within the student body in the likelihood of using computers and of using them actively, but (2) *once students become active users*, group differences in both past experience and frequency of use tend to become small and insignificant. To be sure, even among active users there is a significant direct relationship between positive past experience and frequent use of computers. For the most part, however, the background factors discussed in this section (Tables 8 and 9) are not associated in a dramatic way with differences in past computing experience or frequency of use among active users.

## FAVORABILITY TOWARD COMPUTING: RESULTS OF A SCALE ANALYSIS

Thus far we have focused our attention on two central measures of experience and use: peoples' overall assessment of their past computing experience and their weekly hours of computer use. As a check on the utility of these two measures, and as a means of gaining insight into several dimensions of computing, we asked respondents to state their reactions to a series of sixteen opinion statements that dealt with the psychological, sociological, and educational implications of computers (Appendix 3). Rather than examining variations in responses to each of the sixteen statements individually, we combined these responses into an overall "computing favorability scale" and tested the internal "reliability" of the scale. Reliability is the extent to which results obtained from a measure, or series of related measures, produce consistent patterns of response in repeated measurement applications. Reliability and scaling theory assume that the measures have something in common, or that they try to measure a common underlying trait, characteristic, or concept--such as favorability toward computing. We assumed, therefore, that if individuals expressed favorable (or unfavorable) reactions toward computing on a particular opinion statement, they would *tend* to express favorable or (unfavorable)

opinions toward computing on most of the other statements. If so (and without assuming *complete* consistency), we could transform the separate opinion statements into a general scale of favorability toward computing.

We assessed the reliability of this favorability scale by the "internal consistency method," which gives a numerical estimate of reliability known as Cronbach's Alpha coefficient. The Alpha coefficient is produced by the average correlations among items in a scale, and is based on both the number of scale items (i.e., opinion statements) and their average intercorrelations. While Alpha can range from zero to one, it should not be lower than about .80 for scales that are standardized and frequently used. Alpha, however, is a *conservative* estimate of reliability, so scales slightly below .80 can still be used with confidence.

Our Alphas for the computing favorability scale are .80, .81, and .78, respectively, for students, faculty, and staff--quite respectable reliabilities for a previously untested and unstandardized set of opinion statements. To obtain these reliabilities, we deleted four statements from the scale (questions 40, 42, 44, and 48) because of their consistently low correlations with most of the other statements. The twelve remaining items comprise the favorability scale, and their average correlations with each other are .26 for students, .28 for faculty, and .23 for staff. These correlations ranged from about .05 to .55, with most falling between .20 and .35. This range indicates that, while the opinion statements are all related, they are not *alternative measures* of the same phenomenon but are tapping *different dimensions* of favorability toward computers.

As Table 10 shows, the correlations between the computing favorability scale and several variables we have examined in this report are consistent with previous analyses. The table presents correlations for all respondents as well as for active users only, and the patterns are very similar to our earlier findings. As expected, the highest correlations with the favorability scale are past computing experience, time of first use, and weekly hours of computer use (active users only). Both positive past experience and frequent use of computers are strongly associated with favorability. Similarly, respondents who first used a computer before coming to Brown tend to be more favorable than non-users and those who first used a computer after coming to Brown. Academic division is also significantly correlated with favorability among students (but not among faculty), meaning that students in the physical sciences are more favorable than students in other disciplines. Age, too, is linked to favorability, especially among faculty and staff. Interestingly, the correlation between age and favorability is negative for faculty and staff but positive for students. This means that older students tend to be more favorable toward computers than younger students, but that younger faculty and staff tend to be more favorable than older faculty and staff.

There is also a small, but statistically significant, correlation among students between being male and having more favorable opinions about computing. Graduate and medical students tend to be more favorable than undergraduates, as do students whose family has a computer at home or whose father uses a computer in his work. Among faculty (but not among students or staff), the longer they have been at Brown the less likely they are to be favorable, which is consistent with the negative relationship between age and favorability.

In general, the same patterns of association persist when we look only at active users, although the correlations tend to be smaller and many of them become insignificant (e.g., age for faculty and students). This pattern of reduced correlations is consistent with previous analyses, which have shown that many variables that significantly differentiate all respondents become weaker or insignificant in differentiating active users. Nevertheless, the key variables in this report (past experience and frequency of use) stand

*TABLE 10*

## CORRELATIONS BETWEEN COMPUTING FAVORABILITY SCALE AND SELECTED CHARACTERISTICS OF RESPONDENTS

*All Respondents*

| | STUDENTS | FACULTY | STAFF |
|---|---|---|---|
| Past Experience | .48* | .49* | .41* |
| First Use of Comp. | .22* | .40* | .30* |
| Division of Studies | .21* | .05 | NA |
| Student Status | .15* | NA | NA |
| Brownyears | .05 | -.18* | -.05 |
| Age | .12* | -.21* | -.18* |
| Sex | .14* | .08 | NC |
| Comp. at Home | .13* | NA | NA |
| Dad Uses Comp. at Work | .12* | NA | NA |
| Mom Uses Comp. at Work | .03 | NA | NA |

*Active Users*

| | | | |
|---|---|---|---|
| Past Experience | .44* | .41* | .41* |
| Hours of Use | .27* | .31* | .33* |
| First Use of Comp. | .11* | .07 | .15* |
| Division of Studies | .15* | .13 | NA |
| Student Status | .08* | NA | NA |
| Brownyears | NC | -.14 | .01 |
| Age | .07 | -.11 | -.17* |
| Sex | .09* | .10 | .11 |
| Comp. at Home | .13* | NA | NA |
| Dad Uses Comp. at Work | .12* | NA | NA |
| Mom Uses Comp. at Work | .01 | NA | NA |

*=Significant at <.05 NC=No Correlation NA=Not Applicable

out as having the strongest associations with favorability--even among active users. To repeat an earlier conclusion: familiarity tends to breed contentment.

## CONCLUSIONS AND IMPLICATIONS

Six general conclusions stand out in analyzing the survey data:

*1. There is widespread support for using computers and for upgrading Brown's facilities to accommodate a growing number of users with diverse computing interests.* Over 85% of the survey respondents reported having some previous experience using a computer, and nearly three-quarters of these users characterized their experience as "positive." Seventy percent of these users are active, meaning that they generally utilize computer facilities of some kind on a weekly basis; and over 80% of these active users regard their past computing experience as "positive." Moreover, nearly 85% of all respondents said they want to learn more about computers; about 80% think computers help them work (or could help them work) more effectively; and over 70% believe that computers will be as common as telephones in U.S. homes and offices within the next decade. Perhaps the most revealing finding is that just 13 of the 1622 respondents said they "don't expect to use a computer" in the future.

*2. While word processing is the predominant use of computers at Brown, it is by no means the only major use.* Over 60% of all computer users had done word processing at least once during the six-month period before the survey. On-line information-searching was the second most frequent use (41%), followed by computer programming (36%), electronic communication (35%), data analysis and computation (34%), computer games (33%), and storing personal records, memos, schedules, etc. (32%).

*3. There is broad interest in expanding computer-oriented instruction and in offering more "mini-courses" on using computers.* Forty-three percent of all student respondents said they had already taken a computer science course (not necessarily at Brown), and another 23% said they expect to do so in 1984. While only 14% of the students had attended a "mini-course" on computing (such as CMS, XEDIT, SCRIPT, SPSS, WORD-11, FOCUS, and SAS), 37% of the staff and 24% of the faculty said they had done so. At the same time, nearly 15% of the students remarked that they would like to see more computer science courses offered, and over 25% of the staff mentioned that they would like to see more "mini-courses" or other introductory courses in computing (Table 11). As one staff member commented, "I hate reading the manuals! I would like more on-the-job, 'hands on' training on a one-to-one basis or in small groups." As a group, faculty expressed less interest than staff and students in seeing more computer-oriented coursework (Table 11).

*4. Although a large majority of respondents from all three groups are enthusiastic about using computers, students tend to be less favorable than faculty and staff.* Student computer users are less likely than faculty or staff users to describe their past experience as "positive" (70% vs 84% and 77%), and more likely to report "negative" or "ambivalent" experiences (21% vs 11% and 14%). This general pattern holds for future expectations as well. To some extent, these differences are attributable to the current shortage of terminals. Students, the largest user group on campus, were twice as likely as faculty and staff to complain about limited access to computer terminals. In fact, over one-half of the students in the survey, when asked what sorts of changes they would recommend in Brown's computer services, singled out the need for more terminals (Table 11). Many of them commented at length on this problem, citing long waiting lines, crowding, a lack of privacy, and intense competition for available terminals during peak periods of each

*TABLE 11*

**DISTRIBUTION OF OPEN-ENDED COMMENTS BY GROUP**

| | STUDENTS | FACULTY | STAFF | ALL 3 GROUPS |
|---|---|---|---|---|
| More Computer Science Courses Needed | 14.3 % | 0.9 % | 1.1 % | 10.5 % |
| More Terminal Facilities/ Improve Access | 53.0 | 30.2 | 25.7 | 45.6 |
| Improve Support Services and Documentation | 15.1 | 17.0 | 26.2 | 17.4 |
| More Non-CS Intro and Mini-Courses | 15.0 | 10.4 | 27.9 | 16.9 |
| Improve Reliability/ S.andardize Software | 22.9 | 36.8 | 34.4 | 26.4 |
| Computers Have Negative Social Impacts | 12.9 | 9.4 | 8.7 | 11.8 |
| Favor Expanding Network and Brown Systems | 17.0 | 30.2 | 15.8 | 18.2 |
| Generally Satisfied with Present Brown System | 11.6 | 15.1 | 19.7 | 13.4 |
| Too Much Emphasis, Money Spent on Computers | 11.2 | 17.0 | 3.3 | 10.4 |
| Other Miscellaneous Comments | 23.4 | 26.4 | 21.9 | 23.5 |
| TOTAL NUMBER RESPONDENTS | 713 | 106 | 183 | 1002 |

semester. As one student put it, "The computers at Brown force students to work too closely together in the same room--the tension! I need quiet and a peaceful atmosphere to both write and rewrite. I know a personal computer would solve that, but who can afford one?"

*5. As students become more active computer users, they also become more enthusiastic users; in short, familiarity tends to breed contentment.* Looking at students as a whole, we found that men, graduate and medical students, and students in the physical sciences are significantly more likely than women, undergraduates, and students in disciplines other than the physical sciences to express favorable views of computing. But if we look at active student users only, we find that these differences between groups become small and insignificant. Yet even among active users, we found that those who use computers often and those who first used them before coming to Brown are more likely than less frequent users and those who first used computers after entering Brown to regard their own experience as "positive" and to express generally more favorable views of computing.

*6. While the vast majority of computer users at Brown like to use--or at least don't mind using--computers, there is little evidence to suggest that people are allowing the time they spend using computers to replace other significant social activities.* Half of all the active computer users estimated that they use a computer for five hours or less a week, while only about a fifth said they use a computer for fourteen or more hours a week. Many of the frequent users, moreover, are secretarial staff who would otherwise rely on typewriters if computers were unavailable. Even the most frequent users, the survey suggests, tend to view computers as useful tools, not as magical machines that remold personalities and interpersonal relationships. "Computers are not an end in themselves," one staff member remarked, "and should be as subservient and available as any tool." This sentiment was echoed over and over again by many individuals, and was frequently coupled with insistent warnings about the importance of avoiding computer worship. As one student commented, reflecting the viewpoint of most others, "A computer can be a wonderful tool so long as people don't create too much of a mystique about it."

### *Some Implications*

Perhaps the central message of the survey is that computing at Brown, as at several other American colleges and universities, is fast becoming a basic routine of everyday life for a large majority of people. It is equally clear that a significant minority has not been assimilated into the University's computing environment. Despite the availability of free computer time at Brown, a tenth of the students, a fifth of the staff, and a quarter of the faculty respondents said they had not yet used a computer. Even among those who had, over a quarter were unenthusiastic. Some of these individuals, of course, have little interest in or need for computers, and have chosen for good reasons not to become active computer users. Most, however, want and expect to be active users, but have encountered various problems in doing so--chiefly, problems of access, inconvenience, and inappropriate instruction or training. Clearly, they could benefit greatly from a more "user-friendly" computing environment. As one student said, aptly reflecting an opinion shared by other frustrated novices, "I don't particularly like computers, although I know they are necessary and one must know how to use them. I find that something always seems to be going wrong (crashing, etc.) and most software is not very user-friendly. It seems that the user must know dozens of commands just to get through one particular program." Like any relatively complex skill, there are better and worse ways of learning to use computers; but not much is known about the process of becoming a computer user. If first encounters with computers significantly influence people's motivation and willingness to learn more about using them, then plainly unsatisfying first encounters may well "turn ambivalent

novices into intimidated computer-phobics," as one faculty member put it.

To some extent, of course, the frustration and ambivalence that novices often experience will be reduced as better computer software and hardware become available, making it easier for people to learn on their own. But for now and in the foreseeable future, one challenge at Brown is to explore new, practical opportunities for helping those who want to use computers but hesitate to do so because their first encounter with a computer was intimidating, confusing, and discouraging. One possibility might be to provide free tutorial services in computing, just as Brown now provides free tutorial services in writing through the Writing Center. A "Computing Center" of this kind would not replace the services that Computer Center consultants now provide. Rather, it would give new users, in particular, an opportunity to receive continuous, individualized instruction and practice until they become confident about using computers on their own.

Another theme emerging from the survey is that the Brown community clearly has high expectations for its computing facilities and services, and that the number of users has grown rapidly in recent years. Among faculty and staff computer users, nearly 50% said they had first used a computer only within the past four years. Seventy percent of the freshmen and 66% of the sophomore students, moreover, said they had used a computer before entering Brown, compared to about half of the juniors and seniors. In light of the growing emphasis on "computer literacy" and the proliferation of computers in primary and secondary schools, this "gap" between older and younger undergraduates reflects an ongoing trend toward near-universal pre-college computer instruction in American schools. Within the next two or three years, it seems reasonable to anticipate that virtually every entering Brown student will have had some previous exposure to using computers.

Among other things, this suggests that students will arrive at Brown with rather high expectations for the University's computing services and facilities; we can assume that faculty and staff will share similar high expectations. Will the University be prepared to meet these expectations? At what cost? With what kinds of computer technologies and facilities? Can the University continue to afford offering most computing services on a "library model"--free access to computer time for all students, faculty, and staff? Or will it be forced to move increasingly toward a "utilities model," requiring users to rent or buy personal computers and pay periodic access fees to link up with the University's computer systems? How should user charges be assessed and distributed across individuals, departments, and administrative divisions? What kinds of policies should Brown consider to reduce present and future inequities in computing resources? It was not the purpose of the survey to answer such questions, but it certainly highlights their importance.

However the future system is structured--and by "future" we mean the next five to six years--a host of other issues will need to be addressed. If, as a majority of survey respondents seem to believe, computers are becoming as common a feature of our everyday technological environment as the telephone, this does not mean that their social and educational consequences can be benignly taken for granted. Some 30% of all student respondents believe that "computers contribute to the social isolation of students from one another," and that "using computers in education often results in less personalized treatment of students." In addition, 42% of all respondents said they were disturbed "that a few people in our society know so much about computers, while most people know so little about them"; over half believe that computerized information systems give "too many people access to information about other people"; and 45% expressed concern for the "vulnerability of Brown's computer systems to theft and tampering." Such reservations about computers and their possible consequences, especially within the context of an expansive university-wide network, should not be dismissed lightly.

The experience at other colleges and universities where networking has proceeded further than at Brown may well provide instructive insights into the social costs and benefits of a more computer-intensive environment on this campus. A few schools are now requiring incoming freshmen to buy a personal computer. This may not be the route for Brown to follow, but it may be revealing nonetheless to find out how students at these schools have reacted to the new requirement. In particular, how does the spatial distribution of terminal facilities, personal computers, or workstations affect the social ecology of informal interactions? Do distinctive computer-based subcultures arise and spread; if so, what are their characteristics and consequences? Are there, as a Brown student suggested, "possible ill-effects ... such as depersonalization of education, the demise of other forms of communication, and increased inactivity (decreased creativity)...?" What effects might the growing use of computers have on research and scholarship, the writing process, and faculty-student interaction? "I am interested in computers as tools in education," a faculty member remarked. "My question is: Can they be used to *improve quality*?"

The long-range impacts of computerization at Brown cannot, of course, be forecast with a high degree of reliability. The interactions between a rapidly changing technology and a dynamic social environment, both within and beyond the university, are complex and unpredictable. Yet we can anticipate that computerization may well have enduring consequences for instructional methods, patterns of communication, the quality of student life, attitudes toward time-scheduling, access to and use of information, norms of privacy, and perhaps even conceptions of academic inquiry and autonomy. Already there is concern over how the commitment of large financial resources by major computer companies, now engaged in intense competition for university markets, may affect research priorities, faculty appointments, admissions criteria, and financial planning. In the words of a student respondent, "I'm concerned about the type of contractual relationships Brown will have with IBM, Apple, Apollo, etc. To what extent will Brown become an 'R&D' lab for these corporations?" None of these implications and issues, we should emphasize, are peculiar to the Brown campus. Though different universities may develop their own unique variants of the "wired university," it is clear that all of them, including Brown, are engaged in a collective enterprise characterized by shared prospects, shared problems, and--most importantly--shared opportunities to learn from one another.

Many of these issues, of course, lie beyond the pale of this survey--or any survey. But in a more direct and practical sense, the results suggest that the general course of the University's long-range computing plans are not incompatible with the needs and expectations of a majority of the Brown community. Two-thirds of the survey respondents, for example, think that Brown should develop a university-wide network of personal computers. At the same time, there is disagreement over *how* this should be done and reservations about how far and how fast networking should proceed. "Brown's goal," one student noted, "should not aim at being the widest or best computer system among U.S. colleges, but the most *useful.*" " I'm generally favorable toward the workstations project," said another, "but students and faculty should be brought more fully into the planning and development process." Indeed, one of the most frequent comments people made on the survey was to say, in one way or another, "Thanks for asking about my views."

### *Closing Remarks*

At the risk of oversimplification, what members of the Brown community seem to expect from their computer system is also what they expect from their telephone system: accessible, efficient, and reliable service. One faculty member summed up these

sentiments quite well: "Computers must be easy to learn and use, requiring little time. Once learned, they must meet my needs, and cause me no extraneous frustrations. They should be transparent to my work process, except as they enhance it." Greater accessibility, reliability, and efficiency--lofty and desirable goals indeed--have their price, and therein lies the rub: a more distributed computer network, adequate for the needs and expectations of the Brown community, would also be a costlier one, at least in the short term. Given the already rapid growth in the cost of computing services and facilities, which compete with other University budgetary needs and priorities, to what extent will users be prepared to assume a greater share of the financial burden for sustaining a high-quality computing environment?

The Brown University Survey on Computing was the first attempt to guage how the Brown community at large uses and views computers in the early 1980s. It provides a unique baseline of knowledge against which future changes can be compared and evaluated, and highlights the importance of several research and policy issues in academic computing environments. Although a survey obviously cannot take the place of informed debate, thoughtful policies, and careful planning, it should serve as one contribution to the ongoing process of shaping an appropriate future for computing in the University.

## APPENDIX 1

### *SAMPLING PROCEDURES AND RESPONSE RATES*

The data presented in this report are based on the responses of 1622 members of the Brown community who returned a mail questionnaire (1298) or completed a telephone interview for the survey (324); the sample consists of 1106 students, 176 faculty, and 340 staff (Table A-1). These 1622 respondents constitute about 60% of the final "target" sample of 2693 randomly selected individuals who received either a questionnaire through campus mail (2357) or who were contacted by phone for an interview (336). All 2693 individuals were selected through a simple random sample of 30% of the individuals from five distinct subpopulations in the University: undergraduates (1532), graduate students (326), medical students (81), faculty (289), and staff (465). Approximately 90% of the students and 80% of the faculty and staff received a mail questionnaire; the remaining 10% of students and 20% of the faculty and staff were randomly chosen as telephone interviewees. Mail respondents and telephone interviewees in each of the three major groups (students, faculty, and staff) answered the same series of questions, which consisted of a core set of items for all three groups plus a smaller set of items keyed specifically to each group (see Appendix A-2).

A trained staff of undergraduate and graduate students conducted the interviews during March, April, and May 1984. Before being phoned, all interviewees received a letter through campus mail explaining briefly the purpose of the study and informing them that a staff member would be calling soon to schedule an interview. Mail questionnaires were sent out through campus mail in two streams--the first to everyone in the target sample who was chosen to receive a questionnaire, the second (about three weeks later) only to those who had not returned the first questionnaire. A cover letter accompanied both mailings, explaining the purpose of the survey and asking for the recipient to complete the enclosed questionnaire. Thirty-two percent (751) of the 2357 individuals who received the first questionnaire returned it, and 34% (547) of the 1606 individuals who received the second (follow-up) mailing returned their questionnaire for a combined mail response rate of 55 percent. Among the 336 interviewees, 324 (96%) completed an interview. Altogether, then, 1622 of the 2693 people in the target sample either returned a questionnaire or completed an interview, for a total response rate of 60 percent.

As Table A-2 shows, these 1622 individuals were quite representative of the target sample, and thus of the Brown community from which the target sample was drawn. Staff were slightly overrepresented in the respondent sample (by 4%), while undergraduate and medical students were slightly underrepresented (by 2% and 1%, respectively). Women were slightly overrepresented in the respondent sample, but only by 2% percent. Overrepresentation of women was higher among staff (nearly 5%) than among students (2%). Only among faculty were women respondents *underrepresented* in the respondent sample (by 7%). In summary, the final sample of respondents is quite representative of the target sample across groups and sexes. The slight discrepancies that do exist are unlikely to constitute sources of bias that would compromise the overall representativeness of the respondent sample.

*TABLE A-1*

**RESPONSE RATES (RR) BY GROUP AND MODE**

*N Respondents/ N Contacted (% Responding)*

| | Total RR | Mail RR | Phone RR |
|---|---|---|---|
| ALL STUDENTS | 1106/1939 (57.0) | 916/1747 (52.4) | 190/192 (99.0) |
| Undergraduate | 882/1532 (57.6) | 738/1388 (53.2) | 144/145 (99.3) |
| Graduate | 194/ 326 (59.5) | 157/ 288 (54.5) | 37/ 38 (97.4) |
| Medical | 30/ 81 (37.0) | 21/ 72 (29.2) | 9/ 9 (100.0) |
| FACULTY | 176/ 289 (60.9) | 134/ 244 (54.9) | 42/ 45 (93.3) |
| STAFF | 340/ 465 (73.1) | 248/ 366 (67.8) | 92/ 99 (92.9) |
| TOTAL RESPONSE RATES | 60.2% | 55.1% | 96.4% |
| | 1622/2693 | 1298/2357 | 324/336 |

*TABLE A-2*

## SAMPLING FRAMES AND PROPORTIONS BY GROUP AND SEX

*By Group*

| | TOTAL POPULATION % (N) | ORIGINAL SAMPLE* % (N) | TARGET SAMPLE % (N) | RESPONDENT SAMPLE % (N) |
|---|---|---|---|---|
| STUDENTS | 72.7 (6649) | 72.4 (2029) | 72.0 (1939) | 68.2 (1106) |
| Undergrad | 58.4 (5340) | 57.6 (1614) | 56.9 (1532) | 54.5 (882) |
| Graduate | 11.7 (1066) | 11.9 (333) | 12.1 (326) | 12.0 (194) |
| Medical | 2.7 (243) | 2.9 (82) | 3.0 (82) | 1.8 (30) |
| FACULTY | 10.8 (984) | 10.6 (298) | 10.7 (289) | 10.9 (176) |
| STAFF | 16.5 (1512) | 17.0 (477) | 17.3 (465) | 21.0 (340) |
| TOTALS | 100 (9145) | 100 (2804) | 100 (2693) | 100 (1622) |

*By Group and Sex*

| | | | | |
|---|---|---|---|---|
| STUDENTS | | | | |
| Men | 53.3 (3544) | 52.5 (1065) | 53.0 (1028) | 51.1 (565) |
| Women | 46.7 (3105) | 47.5 (964) | 47.0 (911) | 48.9 (541) |
| FACULTY | | | | |
| Men | 81.2 (799) | 80.5 (240) | 79.9 (231) | 86.9 (153) |
| Women | 18.8 (185) | 19.5 (58) | 20.1 (58) | 13.1 (23) |
| STAFF | | | | |
| Men | 36.4 (550) | 35.4 (169) | 35.1 (163) | 30.6 (104) |
| Women | 63.6 (962) | 64.6 (308) | 64.9 (302) | 69.4 (236) |
| TOTALS | 100 (9145) | 100 (2804) | 100 (2693) | 100 (1622) |
| Men | 53.5 (4893) | 52.6 (1474) | 52.8 (1422) | 50.7 (822) |
| Women | 46.5 (4252) | 47.4 (1330) | 47.2 (1271) | 49.3 (800) |

*111 individuals in original sample were excluded from target sample because they were not at Brown during the survey.

## APPENDIX 2

### *THE QUESTIONNAIRE*

NOTE: Three different versions of the questionnaire were prepared--one each for students, faculty, and staff. The first 87 questions were identical in all three versions, but the remaining questions varied for each group. This Appendix contains the entire student questionnaire, plus the separate series of questions for both faculty and staff. All three versions of the questionnaire contained the three optional open-ended questions.

BROWN UNIVERSITY STUDENT
QUESTIONNAIRE ON COMPUTERS

Please answer the questions by CIRCLING the number of the response that best applies to you. (Answer even if you have not used a computer.)

1. In general, how would you describe your experience in using computers?

   1. POSITIVE
   2. NEGATIVE
   3. AMBIVALENT
   4. NO STRONG FEELINGS EITHER WAY
   5. HAVEN'T USED A COMPUTER

2. How would you describe your feelings about using computers in the future?

   1. POSITIVE
   2. NEGATIVE
   3. AMBIVALENT
   4. NO STRONG FEELINGS EITHER WAY
   5. DON'T EXPECT TO USE A COMPUTER

Circle one of the following responses for EACH of the questions below: (1) YES, I have done this; (2) I haven't done this yet, but I EXPECT TO do so in 1984; or (3) I haven't done this yet, and I have NO PLANS to do so in 1984.

| Have you: | (1) YES | (2) EXPECT TO | (3) NO PLANS |
|---|---|---|---|
| 3. Taken a computer science course? | 1 | 2 | 3 |
| 4. Taken a course in a department other than computer science in which you were required to use a computer? | 1 | 2 | 3 |
| 5. Attended a non-credit "mini-course" on computing (e.g., CMS, XEDIT, SCRIPT, SAS, SPSS, FOCUS, WORD-11, etc.)? | 1 | 2 | 3 |
| 6. Used the computer at the circulation desk in either the Rockefeller or Sciences Library? | 1 | 2 | 3 |
| 7. Visited Brown's Computer Store? | 1 | 2 | 3 |
| 8. Used a computer terminal linked to one of Brown's main computers? | 1 | 2 | 3 |
| 9. Worked as a computer programmer or consultant? | 1 | 2 | 3 |
| 10. Used a personal computer? | 1 | 2 | 3 |
| 11. Acquired a personal computer or computer terminal to use at Brown? | 1 | 2 | 3 |

If you answered "YES" to question No. 11:
What kind(s) and when did you acquire it (them)? List up to three.
(1)_____19___;(2)_____19___;(3)_____19___

If you answered "EXPECT TO" to question No. 11:
What kind do you expect to acquire and when? _____19___

If you answered "NO PLANS" to question No. 11:
Why?_____

12. When did you first use a computer?

1. BEFORE COMING TO BROWN Year of first use: 19____
2. SINCE COMING TO BROWN Year of first use: 19____
3. HAVEN'T USED A COMPUTER YET (Skip to Question No. 33, Page 3)

Over the PAST SIX MONTHS, how often, on average, did you use a computer for each of th following purposes:

| | (1) ALMOST EVERY DAY | (2) FEW TIMES A WEEK | (3) FEW TIMES A MONTH | (4) ONCE A MONTH OR SO | (5) LESS THAN ONCE A MONTH | (6) NOT AT ALL |
|---|---|---|---|---|---|---|
| 13. For data entry? | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. To search for books, journals, or data bases? | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. To play computer games? | 1 | 2 | 3 | 4 | 5 | 6 |
| 16. To write papers, reports, letters, or other documents? | 1 | 2 | 3 | 4 | 5 | 6 |
| 17. For scientific computation or data analysis? | 1 | 2 | 3 | 4 | 5 | 6 |
| 18. To send messages to someone? | 1 | 2 | 3 | 4 | 5 | 6 |
| 19. To collaborate with others, share data, exchange work? | 1 | 2 | 3 | 4 | 5 | 6 |
| 20. To store personal records, memos, schedules, etc.? | 1 | 2 | 3 | 4 | 5 | 6 |
| 21. For data management (e.g., FOCUS)? | 1 | 2 | 3 | 4 | 5 | 6 |
| 22. For writing and "debugging" programs? | 1 | 2 | 3 | 4 | 5 | 6 |

In COMPARISON to the past six months, how often did you use a computer for the following purposes BEFORE COMING TO BROWN:

| | (1) ABOUT AS OFTEN | (2) MORE OFTEN | (3) LESS OFTEN | (4) NOT AT ALL |
|---|---|---|---|---|
| 23. For data entry? | 1 | 2 | 3 | 4 |
| 24. To search for books, journals, or data bases? | 1 | 2 | 3 | 4 |
| 25. To play computer games? | 1 | 2 | 3 | 4 |
| 26. To write papers, reports, letters, or other documents? | 1 | 2 | 3 | 4 |
| 27. For scientific computation or data analysis? | 1 | 2 | 3 | 4 |
| 28. To send messages to someone? | 1 | 2 | 3 | 4 |
| 29. To collaborate with others, share data, exchange work? | 1 | 2 | 3 | 4 |
| 30. To store personal records, memos, schedules, etc.? | 1 | 2 | 3 | 4 |
| 31. For data management (e.g., FOCUS)? | 1 | 2 | 3 | 4 |
| 32. For writing and "debugging" programs? | 1 | 2 | 3 | 4 |

For each of the statements below, circle the number of the response that corresponds most closely to your general opinion. (Answer even if you haven't used a computer yet.)

| | (1) STRONGLY AGREE | (2) AGREE | (3) NEITHER AGREE NOR DISAGREE | (4) DISAGREE | (5) STRONGLY DISAGREE |
|---|---|---|---|---|---|
| 33. Many of my closest friends like to use computers. | 1 | 2 | 3 | 4 | 5 |
| 34. I'm not really interested in learning more about computers. | 1 | 2 | 3 | 4 | 5 |
| 35. I feel confident about my ability to use a computer. | 1 | 2 | 3 | 4 | 5 |
| 36. Using a computer makes me (would probably make me) feel uneasy. | 1 | 2 | 3 | 4 | 5 |
| 37. Overall, using computers helps me (could help me) work more effectively. | 1 | 2 | 3 | 4 | 5 |
| 38. Brown should develop a university wide network of personal computers. | 1 | 2 | 3 | 4 | 5 |
| 39. Using computers in education often results in less personalized treatment of students. | 1 | 2 | 3 | 4 | 5 |
| 40. I prefer mathematics to writing. | 1 | 2 | 3 | 4 | 5 |
| 41. Computers make it easier to work collaboratively with others. | 1 | 2 | 3 | 4 | 5 |
| 42. I'm concerned about the vulnerability of Brown's computer systems to theft and tampering. | 1 | 2 | 3 | 4 | 5 |
| 43. Computers are gaining too much influence over people's lives. | 1 | 2 | 3 | 4 | 5 |
| 44. It disturbs me that a few people in our society know so much about computers, while most people know so little about them. | 1 | 2 | 3 | 4 | 5 |
| 45. Computers can help me improve the quality of my writing. | 1 | 2 | 3 | 4 | 5 |
| 46. Because of computerized information systems, too many people have access to information about other people. | 1 | 2 | 3 | 4 | 5 |
| 47. Computers contribute to the social isolation of students from one another. | 1 | 2 | 3 | 4 | 5 |
| 48. Within ten years or so, computers will be as common as telephones in U.S. homes and offices. | 1 | 2 | 3 | 4 | 5 |

For each of the pairs of words below, circle a number to indicate which word of each pair comes closer to describing how YOU would generally characterize computers. Circle one of the following responses for each pair of words:

(1) If you find the word on the LEFT a VERY APPROPRIATE description;
(2) If the word on the LEFT is a SOMEWHAT APPROPRIATE description;
(3) If NEITHER word is MORE APPROPRIATE than the other;
(4) If the word on the RIGHT is a SOMEWHAT APPROPRIATE description; and
(5) If the word on the RIGHT is a VERY APPROPRIATE description.

| | | | | | | |
|---|---|---|---|---|---|---|
| 49. DIFFICULT | 1 | 2 | 3 | 4 | 5 | EASY |
| 50. FRIENDLY | 1 | 2 | 3 | 4 | 5 | UNFRIENDLY |
| 51. SMART | 1 | 2 | 3 | 4 | 5 | DUMB |
| 52. RIGID | 1 | 2 | 3 | 4 | 5 | FLEXIBLE |
| 53. EXCITING | 1 | 2 | 3 | 4 | 5 | DULL |
| 54. INTIMIDATING | 1 | 2 | 3 | 4 | 5 | REASSURING |
| 55. FEMININE | 1 | 2 | 3 | 4 | 5 | MASCULINE |
| 56. ROUTINE | 1 | 2 | 3 | 4 | 5 | CREATIVE |
| 57. PREDICTABLE | 1 | 2 | 3 | 4 | 5 | UNPREDICTABLE |
| 58. ILLOGICAL | 1 | 2 | 3 | 4 | 5 | LOGICAL |

59. How would you characterize the relevance of research in computer science and 'artificial intelligence' to understanding how people think?

1. VERY RELEVANT
2. SOMEWHAT RELEVANT
3. PROBABLY NOT RELEVANT
4. DON'T KNOW

Comments:_____

**********

COMPUTER USERS ONLY--OTHERS PLEASE SKIP TO QUESTION NO. 69, PAGE 5

**********

60. Would you rather use a computer MORE or LESS often than you do now?

1. MORE OFTEN
2. LESS OFTEN
3. NEITHER MORE NOR LESS OFTEN

61. On average, how many hours per week do you use a computer?_____HOURS

Approximately how many of these hours do you spend using:

62. A personal computer?_____HOURS What kind(s)?_____

63. Brown's main computer system?_____HOURS

64. Another computer system?_____HOURS Which one(s)?_____

65. If you use a personal computer, how SATISFIED or DISSATISFIED are you with it?

1. VERY SATISFIED
2. SATISFIED
3. NEITHER SATISFIED NOR DISSATISFIED
4. DISSATISFIED
5. VERY DISSATISFIED
6. DON'T USE A PERSONAL COMPUTER

Comments:_____

66. What are the three most frequent purposes for which you use a personal computer?

1. MOST FREQUENT:_____
2. SECOND MOST FREQUENT:_____
3. THIRD MOST FREQUENT:_____

67. Do you find that ideas or concepts that you learned through using a comr ıter are also helpful in thinking about other things?

1. YES, QUITE OFTEN
2. YES, OCCASIONALLY
3. NO, NOT REALLY

Comments:_____

68. If a "hacker" were defined as "someone who designs computer programs mainly for the pleasure and challenge of doing so," would you consider yourself a "hacker"?

1. YES
2. NOT YET, BUT I FEEL I COULD BECOME ONE
3. NO, BUT I LIKE TO USE COMPUTERS
4. DEFINITELY NOT--I DON'T LIKE TO USE COMPUTERS

**********

***ALL STUDENTS***

When you write (excluding brief letters and memos), how often do you:

| | (1) FREQUENTLY | (2) OCCASIONALLY | (3) SELDOM | (4) NEVER |
|---|---|---|---|---|
| 69. Make an outline first? | 1 | 2 | 3 | 4 |
| 70. Compose your first draft in longhand? | 1 | 2 | 3 | 4 |
| 71. Compose your first draft with a typewriter? | 1 | 2 | 3 | 4 |
| 72. Compose your first draft with a computer? | 1 | 2 | 3 | 4 |
| 73. Revise sentences or paragraphs as you write them? | 1 | 2 | 3 | 4 |

When you use a library, how often do you use the information sources listed below? For each source, please circle the number that comes closest to your degree of use.

| | (1) FREQUENTLY | (2) OCCASIONALLY | (3) SELDOM | (4) NEVER |
|---|---|---|---|---|
| 74. Books | 1 | 2 | 3 | 4 |
| 75. Periodicals | 1 | 2 | 3 | 4 |
| 76. Newspapers | 1 | 2 | 3 | 4 |
| 77. Reference Sources | 1 | 2 | 3 | 4 |
| 78. Government Documents | 1 | 2 | 3 | 4 |
| 79. Special Collections | 1 | 2 | 3 | 4 |
| 80. Theses, Dissertations | 1 | 2 | 3 | 4 |
| 81. Microformats | 1 | 2 | 3 | 4 |
| 82. Audio-Visual Materials | 1 | 2 | 3 | 4 |
| 83. Maps, Musical Scores | 1 | 2 | 3 | 4 |
| 84. Other:_____ | 1 | 2 | 3 | 4 |

To help us interpret the results of this survey, we'd also like some information about your background and your relationship to Brown.

85. How many years have you been at Brown?_____YEARS

86. Your sex:

1. MALE
2. FEMALE

87. Your age:_____YEARS

88. Your ethnic background:

1. WHITE
2. BLACK
3. HISPANIC
4. ASIAN
5. OTHER:_____

89. Your citizenship:_____

90. Your student status:

1. UNDERGRADUATE STUDENT
2. GRADUATE STUDENT (Skip to Question No. 94, Page 7)
3. MEDICAL STUDENT (Skip to Question No. 96, Page 7)

***UNDERGRADUATES ONLY***

91. What is your current year of undergraduate studies?

1. FRESHMAN
2. SOPHOMORE
3. JUNIOR
4. SENIOR
5. NON-DEGREE (SPECIAL) STUDENT

92. Within which division is your concentration or expected concentration?

1. HUMANITIES
2. LIFE SCIENCES
3. PHYSICAL SCIENCES
4. SOCIAL SCIENCES
5. COMBINED (specify divisions):_____

93. Are you receiving any financial aid from the university other than campus employment or loans?

1. YES
2. NO

(Please Skip to Question No. 97, Page 8)

***GRADUATE STUDENTS ONLY***

94. What is your current year of graduate studies?

1. FIRST YEAR
2. SECOND YEAR
3. THIRD YEAR
4. FOURTH YEAR OR MORE
5. NON-DEGREE (SPECIAL) STUDENT

95. Within which division is your department or program?

1. HUMANITIES
2. LIFE SCIENCES
3. PHYSICAL SCIENCES
4. SOCIAL SCIENCES
5. COMBINED (specify divisions):_____

(Please Skip to Question No. 97, Page 8)

***MEDICAL STUDENTS ONLY***

96. What is your current year of medical school?

1. FIRST YEAR
2. SECOND YEAR
3. THIRD YEAR
4. FOURTH YEAR OR MORE

***ALL STUDENTS***

97. Do you (or does your family) have a personal computer or computer terminal at home?

1. YES What kind?_____
2. NO

98. Do you expect to use a computer in your future work?

1. YES
2. NO
3. DON'T KNOW

99. What do you foresee as your most likely future occupation?

(briefly describe):_____

100. What is the highest level of education that your mother completed?

1. SOME HIGH SCHOOL
2. COMPLETED HIGH SCHOOL
3. SOME COLLEGE (major):_____
4. COMPLETED COLLEGE (major):_____
5. SOME GRADUATE WORK (field):_____
6. A GRADUATE DEGREE (degree and field):_____
7. OTHER (describe):_____

101. What is the highest level of education that your father completed?

1. SOME HIGH SCHOOL
2. COMPLETED HIGH SCHOOL
3. SOME COLLEGE (major):_____
4. COMPLETED COLLEGE (major):_____
5. SOME GRADUATE WORK (field):_____
6. A GRADUATE DEGREE (degree and field):_____
7. OTHER (describe):_____

102. What kind of work does your mother do? (If she is retired or dead, describe the kind of work she used to do.)

(briefly describe):_____

103. Does (did) your mother use a computer or word processor in her work?

1. YES
2. NO
3. DON'T KNOW

104. What kind of work does your father do? (If he is retired or dead, describe the kind of work he used to do.)

(briefly describe):_____

105. Does (did) your father use a computer or word processor in his work?

1. YES
2. NO
3. DON'T KNOW

**********
OPTIONAL QUESTIONS - ANSWER IF YOU WISH
**********

What changes, if any, would you recommend in computing at Brown?

If you have any comments on what you like or don't like about computers (both in general and here at Brown), please write them in the space below.

Use the space below for any comments you might have on this questionnaire or on your responses to particular questions.

**********

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE TO THE CAMPUS MAIL DROP IN THE BASEMENT OF FAUNCE HOUSE EAST. OR SEND IT BY CAMPUS MAIL TO:

IRIS SURVEY PROJECT
CAMPUS MAIL DROP

THANKS FOR YOUR COOPERATION!



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## ADDITIONAL FACULTY QUESTIONS

88. What is your current faculty title at Brown?

1. PROFESSOR OR ASSOCIATE PROFESSOR
2. ASSISTANT PROFESSOR
4. VISITING PROFESSOR OR ASSOCIATE PROFESSOR
5. VISITING ASSISTANT PROFESSOR
6. OTHER:_____

89. How long have you held your current faculty title?_____YEARS

90. What is your disciplinary division?

1. HUMANITIES
2. LIFE SCIENCES
3. PHYSICAL SCIENCES
4. SOCIAL SCIENCES
5. JOINT APPOINTMENT (specify divisions):_____

91. Are you campus-based or hospital-based?

1. CAMPUS-BASED
2. HOSPITAL-BASED

92. In your research and scholarly work, how often do you collaborate with other colleagues?

1. FREQUENTLY
2. OCASSIONALLY
3. SELDOM
4. NEVER

93. When you work with other colleagues, how many of them do you typically work with?

1. ONE
2. TWO
3. THREE
4. MORE THAN THREE
5. ALWAYS WORK BY MYSELF

94. Do you collaborate with colleagues outside of Brown?

1. YES, FREQUENTLY
2. YES, OCASSIONALLY
3. YES, BUT SELDOM
4. NO, HARDLY EVER

How often do you communicate with your research colleagues by each of the following means:

| | (1) FREQUENTLY | (2) OCCASIONALLY | (3) SELDOM | (4) NEVER |
|---|---|---|---|---|
| 95. Face-to-face conversations? | 1 | 2 | 3 | 4 |
| 96. Telephone? | 1 | 2 | 3 | 4 |
| 97. Letters? | 1 | 2 | 3 | 4 |
| 98. Electronic mail? | 1 | 2 | 3 | 4 |
| 99. Other?_____ | 1 | 2 | 3 | 4 |

100. At what stage do you typically show your work to colleagues?

1. EARLY MANUSCRIPT
2. FINISHED MANUSCRIPT
3. THROUGHOUT THE PROCESS

## ADDITIONAL STAFF QUESTIONS

88. What is your current position title at Brown?

(please describe):_____

89. How long have you held your current position?_____YEARS

90. What is the highest level of education that you have completed?

1. SOME HIGH SCHOOL
2. COMPLETED HIGH SCHOOL
3. SOME COLLEGE (major):_____
4. COMPLETED COLLEGE (major):_____
5. SOME GRADUATE WORK (field):_____
6. A GRADUATE DEGREE (degree and field):_____
7. OTHER (describe):_____

APPENDIX 3

OPINIONS ABOUT COMPUTERS AND THEIR IMPLICATIONS
(All Respondents)

| | STRONGLY AGREE | AGREE | NEITHER AGREE NOR DISAGREE | DISAGREE | STRONGLY DISAGREE |
|---|---|---|---|---|---|
| 33. Many of my closest colleagues like to use computers. | 25.4% | 41.4% | 20.7% | 11.0% | 1.5% |
| 34. I'm not really interested in learning more about computers. | 1.8 | 4.3 | 7.3 | 42.9 | 43.7 |
| 35. I feel confident about my ability to use a computer. | 20.8 | 34.5 | 17.1 | 17.6 | 10.0 |
| 36. Using a computer makes me (would probably make me) feel uneasy. | 2.5 | 10.1 | 11.5 | 39.4 | 36.4 |
| 37. Overall, using computers helps me (could help me) work more effectively. | 36.4 | 41.4 | 15.6 | 5.2 | 1.4 |
| 38. Brown should develop a university-wide network of personal computers. | 32.0 | 33.3 | 23.1 | 7.6 | 4.0 |
| 39. Using computers in education often results in less personalized treatment of students. | 6.8 | 22.6 | 32.4 | 30.7 | 7.5 |
| 40. I prefer mathematics to writing. | 6.5 | 16.2 | 21.7 | 27.2 | 28.4 |
| 41. Computers make it easier to work collaboratively with others. | 6.3 | 27.5 | 49.3 | 13.8 | 3.2 |
| 42. I'm concerned about the vulnerability of Brown's computer systems to theft and tampering. | 9.2 | 30.0 | 37.5 | 19.8 | 3.5 |
| 43. Computers are gaining too much influence over people's lives. | 7.1 | 22.1 | 25.5 | 36.1 | 9.2 |
| 44. It disturbs me that a few people in our society know so much about computers, while most people know so little about them. | 9.4 | 32.2 | 26.8 | 26.1 | 5.5 |
| 45. Computers can help me improve the quality of my writing. | 12.8 | 31.6 | 22.7 | 25.4 | 7.6 |
| 46. Because of computerized information systems, too many people have access to information about other people. | 12.6 | 38.3 | 27.7 | 19.2 | 2.2 |
| 47. Computers contribute to the social isolation of students from one another. | 4.9 | 21.0 | 28.9 | 37.3 | 7.9 |
| 48. Within ten years or so, computers will be as common as telephones in U.S. homes and offices. | 19.7 | 50.9 | 14.0 | 14.1 | 1.3 |